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PROBLEMS AND IMPORTANCE OF CHEMISTRY IN THE GDR 1951-1955 FIVE-YEAR PLAN

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Berlin

[Comment: The following information is based on a talk given by Dr Bertsch at a conference of German chemists held in Leipzig on 17-20 October 1951, as reported in the Berlin/Leipzig monthly periodical, Chemische Technik, Vol IV, No 1, January 1952.]

The following important points were considered prior to the establishment of a Five-Year Plan for the chemical industry:

1. No teaching, research, development, and industrial activity are to be allowed which can serve, directly or indirectly, war preparation and the creation of a war potential. Therefore, in the chemical industry of the German Democratic Republic, no plants are to be found for the production of poison gases, military explosives or ammunition, or rocket and jet fuels; in short, no plants connected with any sinister activities are permitted in our science and industry.

This obligation is taken very seriously on our side. It is known, for instance, that we are destroying a large amount of the chlorine we are producing, until we find a way, by a concerted effort, to utilize these quantities of chlorine in industry for peaceful purposes.

2. There is an unflinching belief in the restoration of German unity. In considering expansion of our production, present production capacity of all Germany was taken into account. Our plan will not contain any increases or expansion in production, which, after restoration of German unity, would result in economic waste of production means and manpower and thus would constitute an investment loss. It is not always easy to adhere to this principle, because we are suffering from many difficulties in exchanging goods with West Germany. This

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can be seen from the restriction lists, for which we have to thank certain groups in West Germany and the Anglo-US occupation powers. We shall have to find certain limits in this principle to satisfy the requirements of our industry.

3. To carry out that production for which domestic sources of raw materials are available and which can be carried out by our own means, we are, for instance, not considering in our plan to build large plants for the processing of coal tar. Of course, we are lacking a number of aromatics. However, we do not have any hard coal deposits worth mentioning, and we consider that this field should be left to our friendly neighbor, Poland. That country is the proper place for the development of an extensive coal tar chemistry.

This principle calls for efforts on our part to reduce our imports to the minimum required amount We cannot afford to export production items (goods) so as to import goods which we can produce from domestic raw materials at home. It is no coincidence, therefore, that we had already started to build in our Two-Year Plan our own plants for the production of synthetic fatty acids for technical uses, as we do not want to be dependent on the hazards and fluctuations of the world markets for fats.

During the Five-Year Plan, the value of production in the chemical industry will increase to 182 percent, assuming the 1950 production value index as 100 percent, which is equal to an increase of almost 7 billion marks by 1955. Many important figures pertaining to chemical production were made known by Walter Ulbricht at the Third Party Congress of the German Socialist Unity party It is interesting at this point to consider a number of facts which were reported by Herr Menne, president of the Economic Council for the Chemical Industry of West Germany, at meetings of the Society of German Chemists in Cologne and of the Society for Fat Research in Hamburg. The hopes expressed by Herr Menne for West Germany are probably hopes which will never be fulfilled. He stated, for instance, that investments in the West German chemical industry should amount to 500 million marks per year, which, in my opinion (and I must say that I consider myself qualified to express such an opinion), is rather too low a figure. There is no doubt that the West German government will not make allowance for this requirement and that the danger exists that the investment needs of our West German chemical industry will be satisfied in certain definite fields and to a large extent by contributions (or participation) from foreign countries. This is an unpleasant solution of the problem, since we, on our part, do not desire a controlling participation of foreign countries in such an important field, which would place our industry in a very dangerous position of dependence on foreign countries.

Another statement made by Herr Menne is also of interest He announced that the chemical industry had managed to obtain, through voluntary contributions, the sum of 1 5 million marks for the support of universities and research institutes Herr Menne expressed the hope that the federal government would contribute an equal amount for the support of chemical research Anyone who is familiar with our plan will realize that this sum of 1 5 million marks is very small compared to the financial sums which are made available on our side, as provided within our plan and by law, for the stimulation of research For our plan provides a sum of 400 million marks during the 5-year period for research alone of which an unusually high amount is assigned to chemical research In addition, a considerable amount is made available for the support of universities

Further, our people-owned industry disposes of considerable funds for carrying out research, so that teaching and research will be tremendously encouraged within the scope of our plan and will surpass by far anything imaginable in the West.

Also, what Menne had to say about production and the index of production cannot be envied by us but rather serves as a cause for deeply regretting the splitting of Germany and its consequences. He said that the index of production in the chemical industry is at present equal to 140, as compared to [100 in] 1936. The index of production in our chemical industry was already 167 in 1950 and will become three times higher than the 1936 figure during the course of the Five-Year Plan. Menne stated further that the highest turnover of this year was reached in June 1951 and amounted to about 450 million marks. It is an integral part of our economic planning policy to avoid ups and downs in production values and in goals depending on fluctuations of the market, and to permit a constant, predictable growth in the scope of an over-all plan allowing long-range working conditions and a clear conception of the development of our industry.

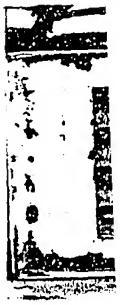
The future of the West German chemical industry, as acknowledged by Menne, cannot be judged in an optimistic manner in view of the sharp competition which exists in foreign markets. It is an intolerable situation that production of certain chemicals is still forbidden and that production of other chemicals is subject to control by the occupation powers. Menne expressed the hope that clarification of this situation would be achieved in connection with the reshaping of political conditions.

Our plan has no obstacles to overcome which could hinder the fulfillment of the plan targets. We, therefore, wish to adhere to the conclusions drawn by Menne and also express the hope that in connection with the new ordering of political relations which will be considered by our national Assembly, the day may come when our West German colleagues will work together with us on plans for increasing the chemical production of all of Germany and for fully developing the inventive and research capacities available to German chemical science.

The chemical industry during the Five-Year Plan, will be confronted with basic problems in a few, but fundamental fields. When the plan states that the production of sulfuric acid will amount to 450,000 tons of SO_3 per year, that of caustic soda to 300 000 tons of NAOH per year, and that of calcined soda to 640,000 tons of NA_2CO_3 per year, this does not mean that these figures are to be achieved by utilizing known methods and raw materials which are not available in the German Democratic Republic. Rather, it is an important problem for our inorganic industry to develop processes for the production of SO_3 from the abundantly occurring sulfates. A plant for the production of SO_3 from anhydrite is being built, and large-scale technical experiments are under way for the production of SO_3 from magnesium sulfate, which will be supplemented [expanded] by SO_3 production from kieserite obtained as a by-product in the potash industry.

In view of the steady rise of our synthetic fiber production not only sulfuric acid but also caustic soda plays an important role. Here, we are in conflict with the first of the three points taken into consideration prior to the establishment of the Five-Year Plan [see above], and we must take care that no plants are built which could serve armaments or war purposes. We are therefore obliged to coordinate the increase in caustic soda production with the problem of utilizing the chlorine simultaneously obtained. We must tie up our caustic soda production with synthetic fiber production, on the one hand, and with sulfuric acid production, on the other, and we will have to effect transpositions and changes in the locations of our industry to arrive at a rational solution of the distressing chlorine situation. This cannot be solved by manufacturing a substantial amount of caustic soda by the lime-soda process. This process is being utilized as much as possible and will be utilized to an even greater extent in the future, but we must also develop entirely different methods.

An important problem of the five-Year Plan in the inorganic field lies in paying increased attention to the by-products of our potash industry. We cannot afford in the long run to dispose of our spent magnesium chloride liquor by simply letting it run into our rivers, beside the fact that rivers are just not able



to receive such amounts of spent liquor. We cannot afford to waste kieserite and other by-products instead of utilizing them. We shall, therefore, have to devote a great deal of attention to the chemistry of potash by-products. It is known that research work along these lines is being instigated in the scope of our chemical Five-Year Plan.

Another problem is the treatment of crude phosphate minerals in the fertilizer sector. Here also, treatment of phosphates with sulfuric acid cannot be carried out. Work on the treatment of crude phosphates with hydrogen chloride, nitric acid, and by thermal methods has not only been started, but technical developments in this field have already been achieved. It is imperative that the scientific basis of this problem be established exhaustively and in detail, and that a background be created for supporting further investments in this branch of industry

Important and serious problems are to be noted in the field of organic basic chemistry We have here a valuable source of raw materials, namely brown coal It is logical and clear that we give the greatest attention to the chemistry of brown coal Tar from hard coal, which can supply the required demand for aromatics, is not available to us.

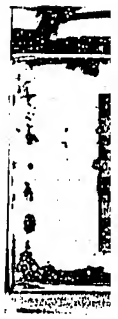
Our research must enable us to create methods utilizing the gasification products of brown coal, (and this process is to be studied under various temperatures and conditions), which are suitable not only for the production of phenols but also of other aromatics and aromatic hydrocarbons.

Methods for the aromatization of aliphatic hydrocarbons must be found, and a carbon monoxide chemistry must be applied on a wide scale. The methods of pure carbon monoxide chemistry, as modern and important as they may be, have already been completely utilized, although the discovery of a number of improvements and new facts is to be expected on the basis of further studies

We must start a study of methods for the utilization of brown coal, and we must consider brown coal, as a raw material from which all the products required by a modern chemical industry can be prepared.

A similar situation exists in the field of chemical high polymers Our republic has in its territory an excellent material basis for the utilization of acetylene chemistry. Despite the notable achievements of this branch of chemistry in the field of plastics and synthetic fibers of the Orlon, Nylon, and Perlon type, it will not furnish a sufficient source of supply for our chemical polymers. The problem of utilizing naturally-occurring raw material sources arises in this field In this respect, it appears advisable to utilize the pentoses occurring in wood, straw, and peat and to create a new furfurol and furan chemistry We shall have to operate this furan chemistry along the same lines as the Reppe synthesis, based on acetylene, and we will also operate a chemical industry based on pentoses, which are available in large quantities, so as to produce intermediates which we cannot obtain from benzene in view of the lack of that hydrocarbon.

Behind this brown-coal chemistry, there is a much more difficult and larger problem, that of coal in general, which for our chemists means the problem of coke We do not have large hard coal deposits, and we cannot expect to be able to import from friendly countries sufficiently large quantities of metallurgical coke and coke for the chemical industry. The coal situation is very complicated in the whole world. We are, therefore, obliged not only to be careful in the use of coke that we produce or import but also must check our chemical processes and attempt to save coke when carbon is not a direct and indispensable agent in reduction processes This means that we cannot afford to produce large amounts



of carbon dioxide for the production of soda or for other uses in the common limestone kilns with the aid of coke. New methods must be instituted; perhaps large limestone kilns based on producer gas ought to be developed, other sources of carbon dioxide used, or perhaps even our whole soda industry changed. Where carbon is used as a reducing agent, attempts should be made to use carbon monoxide instead of carbon. Of course, we cannot charge a carbide furnace with carbon monoxide instead of coke. It is urgent that our chemists should devote their attention to the following problems: How can such a costly chemical raw material as coke be replaced by other products? How can a usable, strong metallurgical coke with a low ash content be prepared from brown coal? And, how can products be obtained by gasification of brown coal, which will indirectly replace coke?

Finally, the field of silicate chemistry might be mentioned. In this field, we expect important scientific results in basic research and improvement of knowledge, which will permit us to achieve further progress in the important field of heat-resistant plastics.

To carry out these tasks, it is necessary to develop further the required equipment, with regard to its construction, quality, and technical aspects. This will require in the future a much closer cooperation between chemists and engineers. The goal of the education of chemists should not be the training of narrow specialists but training on a basis as broad as possible to satisfy these requirements. Cooperation with engineers and constructors in the machine industry must result in such a thorough exchange of experience that we, as chemists, will for the first time be in a position to apply our ideas at the producing plants. It is also important that we impart technical knowledge and guidance to the working shifts in the plants to a greater extent than in the past. We cannot tolerate today that our workers in the chemical industry stand in front of equipment and do not know what processes are being carried out with the aid of this equipment. If we are unable to solve this problem in the right manner, we shall not be able to achieve the targets of our plan for the chemical industry.

The above considerations make it necessary to achieve an extraordinary development of our universities and specialized schools. We are entitled to say that "a wave of learning" has also started in our chemical industry. The workers in our plants are constantly attempting to increase their knowledge and experience. Our government has created a number of regulations and laws for the improvement of the living standard of the workers and for a general stimulation of a technical intellectual class. This past month, many colleagues, workers, engineers, and chemists have been awarded the national prize, or have won other distinctions as specialized shock workers. It can be constantly repeated that concern for man occupies a central position in our planning. The preservation of knowledge and of people in general are indispensable prerequisites for the execution of all our plans. In this manner, our Five-Year Plan is devoted to a great goal, namely, the achievement of a high living standard in a peaceful, democratic Germany.

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